

1 We claim:

2 1. An aneurysm treatment device for *in situ* treatment of aneurysms in mammals,
3 optionally humans, the treatment device comprising at least one resiliently
4 collapsible implant collapsible from a first, expanded configuration wherein the
5 implant can support the wall of an aneurysm to a second collapsed configuration
6 wherein the collapsible implant is deliverable into the aneurysm, and wherein the
7 implant does not completely fill the aneurysm.

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9 2. An aneurysm treatment device according to claim 1 wherein the implant has
10 sufficient resilience, or swellability, to return to an expanded configuration within
11 the lumen of the aneurysm.

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13 3. An aneurysm treatment device according to claim 1 wherein the implant is
14 configured so that hydraulic forces within the aneurysm tend to urge the implant
15 against the aneurysm wall.

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17 4. An aneurysm treatment device according to claim 1 wherein the collapsible
18 implant comprises a spreadable portion and a projecting portion, the spreadable
19 portion capable of resting against and providing support to an inner wall of the
20 aneurysm, the projecting portion being integral with the spreadable portion and
21 being capable of being gripped for insertion and positioning of the implant.

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23 5. An aneurysm treatment device according to claim 1 wherein the implant
24 comprises a resiliently compressible polymeric foam.

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26 6. An aneurysm treatment device according to claim 5 wherein the foam member
27 comprises a hydrophobic foam scaffold member coated on the pore surfaces of the
28 foam, within the foam body, to be hydrophilic, optionally with a coating of
29 hydrophilic foam material.

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2 7. An aneurysm treatment device according to claim 6 wherein the foam member
3 comprises a hydrophobic foam scaffold member coated on the pore surfaces of the
4 foam and throughout the pores of the foam with a hydrophilic foam, and wherein
5 the hydrophilic foam carries a pharmacologic agent, optionally fibrin or a fibroblast
6 growth factor, or both.

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8 8. An aneurysm treatment device according to claim 1 comprises a pair of implants
9 cooperable to stabilize the aneurysm.

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11 9. An aneurysm treatment device according to claim 8 wherein one implant,
12 optionally a generally wine glass-shaped implant, can be seated in the neck of the
13 aneurysm and has a spreading portion spreading into the aneurysm to support the
14 aneurysm wall adjacent the antrum and the other implant, optionally a generally
15 mushroom-shaped implant, can ride in the aneurysm and has a spreading portion
16 to support the aneurysm wall opposite the neck of the aneurysm.

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18 10. An aneurysm treatment device according to claim 1 wherein the implant
19 further comprises one or more bioactive materials selected from the group
20 consisting of elastin, growth factors capable of fostering fibroblast proliferation,
21 pharmacologic agents, sclerotic agents, inflammatory substances, genetically acting
22 therapeutics and genetically engineered therapeutics.

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24 11 An aneurysm treatment device according to claim 1 comprising a set of multiple
25 ones of the implant, the set comprising a range of different sizes of the implant,
26 optionally from 2 to about 10 different sizes, and a range of different shapes of the
27 implant, optionally from 2 to about 6 different shapes in one or more of the sizes.

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29 12. An aneurysm treatment device according to claim 1 wherein the spreading

1 portion of the implant comprises a convex outer surface to contact the aneurysm
2 wall and a concave inner surface.

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4 13. An aneurysm treatment device according to claim 1 wherein implant comprises
5 a foam member having an inner surface and an outer surface, the outer surface
6 having areas of elevations and depression capable of allowing blood flow between
7 the inner wall of the aneurysm and the outer surface of the foam member.

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9 14. An aneurysm treatment device according to claim 1 wherein the implant is
10 porous and permits blood flow into the interior of the implant.

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12 15. An aneurysm treatment device according to claim 1 wherein the implant
13 comprises a reticulated biodurable elastomeric matrix.

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15 16. An aneurysm treatment device according to claim 1 wherein the implant
16 comprises a reticulated biodurable elastomeric matrix and the implant exhibits
17 resilient recovery from compression.

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19 17. An aneurysm treatment device according to claim 1 comprising multiple
20 implants wherein each implant has the shape of a cylinder, a right cylinder, is
21 bullet-shaped, is bullet-shaped with a blind hollow volume, has a tapered, frusto-
22 conical shape optionally with an open-ended hollow volume with a circular, square,
23 rectangular, polygonal cross-section.

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25 18. A method of treating an aneurysm comprising the steps of:

- 26 a) imaging an aneurysm to be treated to determine its size and topography;
- 27 b) selecting an aneurysm treatment device according to claim 1 for use in
- 28 treating the aneurysm; and
- 29 c) implanting the aneurysm treatment device into the aneurysm.

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2 19. A method according to claim 18 further comprising:

- 3 d) loading the aneurysm treatment device into a catheter;
- 4 e) threading the catheter through an artery to the aneurysm; and
- 5 f) positioning and releasing the aneurysm treatment device in the aneurysm.

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7 20. A method of treating an aneurysm comprising the steps of:

- 8 a) imaging an aneurysm to be treated to determine its size and topography;
- 9 b) constructing an aneurysm treatment device to be shaped to fill the aneurysm
- 10 *in situ* and to be deliverable via a catheter, the aneurysm treatment device
- 11 optionally being resiliently collapsible or swellable to expand to shape *in situ*
- 12 and including in the aneurysm treatment device a pharmacologic agent for
- 13 delivery within the aneurysm;
- 14 c) implanting the aneurysm treatment device into the aneurysm.

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16 21. A method according to claim 18 wherein the aneurysm treatment device is

17 configured to permit limited blood access between the implant and the aneurysm

18 wall, optionally without significantly pulsing the aneurysm wall.

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20 22. A method for the treatment or prevention of endoleaks from an implanted

21 endovascular graft into a target vascular site, optionally an aneurysm, the method

22 comprising delivering a number of porous and/or reticulated elastomeric implants

23 in a compressed state, into the target site.

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25 23. A method according to claim 22 wherein the number of implants is in the range

26 of from about 2 to about 100.

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28 24. A method according to claim 23 wherein the implants comprise reticulated

29 biodegradable elastomeric matrices.